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SOURCE Zhurnal Obshchey Khimii, Vol XIX No 10, 1949.

THE RATE OF FORMATION OF TETRAFLUOROBORIC ACID  
IN MIXTURES OF HYDROFLUORIC AND BORIC ACIDS, I and II

I. by I. G. Ryss and M. M. Slutskaya; II. by Ryss, both of Dnepropetrovsk  
Metallurgical Institute, Laboratory of General Chemistry

## I.

The rate of formation of  $\text{HBF}_4$  at  $30^\circ\text{C}$  in mixtures of hydrofluoric and boric acids was determined for initial concentrations of HF of from 0.268 M to 0.0394 M and ratios of  $\text{HF}/\text{H}_3\text{BO}_3$  of from 8 to 2. Slight increases in the rate of the reaction were noted when the ratio of  $\text{HF}/\text{H}_3\text{BO}_3$  was increased, and an abrupt increase was caused by an increase in the concentration of the solution.

The formal order of the reaction was calculated as close to 2.7-3.  
In 20% HF the reaction was completed in 2-3 minutes.

Temperature increases sharply increased the rate of the reaction, but also brought about lower yields. Submitted July 5, 1948.

## BIBLIOGRAPHY

1. R. Abegg, C. Fox, and W. Herz, Z. allg. anorg. ch., Vol XXXV, p 129 (1903)
2. A. Travers and L. Malaprade, Bull. Soc. Chim., Vol. XLVII, p 788 (1930)
3. I. G. Ryss and M. M. Slutskaya, DAN, Vol LVII, p 689 (1947)

## II.

Experimental data on the rate of formation of tetrafluoroboric acid contradicted the hypothesis of the spontaneous formation of  $\text{BF}_4$  and con-  
curred with the following description: Following the instantaneous formation  
of strong hydrofluoroboric acid, there occurs a slow bimolecular interaction  
of the undissociated portion of the  $\text{BF}_3\text{H}_2\text{O}$  molecules with the HF molecules.

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The relation between the constant of the rate of the reaction and the constant of dissociation of  $\text{BF}_3\text{H}_2\text{O}$  was calculated to range from 7.3 to 11.1.2-mole $\cdot$ 2.min. $^{-1}$ .

The postulated scheme explained the results obtained by other authors in measuring the heat of solution of boric acid in hydrofluoric acid as well as their measurements of the electroconductivity of the mixtures.

For mixtures with  $\text{HF}/\text{H}_3\text{BO}_3 < 3$ , the mechanism of the reaction was thought to vary from the above description. Submitted June 5, 1948.

#### BIBLIOGRAPHY

1. I. G. Ryss and M. M. Slutskaya, ZhOKh, Vol XIX, 41, (1949)
2. I. G. Ryss, DAN, Vol LII, 421 (1946)
3. I. G. Ryss and M. M. Slutskaya, DAN, Vol LVII, p 689 (1947)
4. I. G. Ryss, DAN, Vol LIV, p 327 (1946)
5. I. G. Ryss, and M. M. Slutskaya, KhFKh, Vol XXI, p 549 (1947)
6. I. Thomsen, Thermochemische Untersuchungen, Vols. I-II (1882)
7. A. Travers and L. Malapraie, Bull. Soc. Chim., Vol. XLVIII, p 788, (1930)
8. O. Mulbert, A. allg. anorg. Ch., Vol LXXV, p 198 (1912)
9. R. Abegg, C. Fox, and W. Herz, A. allg., anorg. Ch., Vol XXXV, 129 (1903)
10. Wamser, J. Am. Soc., Vol LXX, p 1209 (1948)

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